CLAIMS

1. An ARQ (re-) transmission method in a wireless communication system wherein data packets are transmitted from a transmitter to a receiver, using a first transmission and at least a second transmission based on a repeat request comprising the steps of

   modulating data at the transmitter using a first signal constellation pattern to obtain a first data symbol,

   performing the first transmission by transmitting the first data symbol to the receiver over a first diversity branch;

   modulating said data at the transmitter using a second signal constellation pattern to obtain a second data symbol;

   performing the second transmission by transmitting the second data symbol to the receiver over a second diversity branch;

   demodulating the received first and second data symbol at the receiver using the first and second signal constellation pattern respectively, and

   diversity combining the demodulated data.

2. The method according to claim 1, wherein the data to be transmitted contains at least one data packet comprising a plurality of data bits which are encoded using a forward error correction (FEC) scheme prior to modulation.

3. The method according to claim 2, wherein employed encoding scheme is a Turbo coding scheme.

4. The method according to one of claims 1 to 3, wherein the employed modulation scheme is a higher order modulation scheme such as M-PSK, M-QAM with $\log_2 (M) > 2$ wherein the data bits mapped onto the data symbols have different bit reliabilities depending on the chosen mapping.

5. The method according to one of claims 1 to 4, wherein the modulation pattern is 16 QAM and a number of $\log_2(M)$ signal constellation patterns are used.

6. The method according to one of claims 1 to 5, wherein the signal constellation pattern for the first and second diversity branches are selected such that after combining the data bits, the differences in magnitude among the combined bit reliabilities are reduced.

7. The method according to one of claims 1 to 6, wherein the data for transmission is modulated using a single redundancy version scheme with an identical data bit sequence.

8. The method according to one of claims 1 to 7, wherein the data for transmission is modulated using a multiple redundancy version scheme of partly identical bits.

9. The method according to one of claims 1 to 8, wherein the first and second signal constellation patterns are pre-stored in a memory table.

10. The method according to one of claims 1 to 9, wherein the first and second signal constellation patterns are signaled to the receiver.

11. The method according to one of claims 1 to 10, wherein the properties of the first and second signal constellation patterns are obtained by interleaving the positions of and/or inverting the bit values of the bits mapped onto the signal constellation patterns.

12. The method according to one of claims 1 to 11, wherein the interleaving is performed with symbols resulting in an intra-symbol interleaving.

13. The method according to one of claims 1 to 12, wherein the data is transmitted with a plurality of redundancy versions, and the transmitted bits comprise systematic and parity bits and the systematic bits are included in each redundancy version.

14. The method according to one of claims 1 to 13, wherein the combined mean bit reliabilities for the systematic bits are higher than that of the parity bits.

15. The method according to one of claims 1 to 14, wherein the first transmission comprises using the first and a third signal constellation pattern and transmitting

the data modulated with the first and third signal constellation pattern over the first and a third diversity branch.

16. The method according to one of claims 1 to 15, wherein the second transmission comprises using the second and a fourth signal constellation pattern and transmitting the data modulated with the second and fourth signal constellation pattern over the second and a fourth diversity branch.

17. A transmitter for ARQ (re-) transmission of data in a wireless communication system wherein data packets are transmitted to a receiver using a first transmission and at least a second transmission based on a repeat request received from a receiver, comprising:

a mapping unit for modulating data using a first signal constellation pattern to obtain a first data symbol;

a transmitting unit for performing the first transmission by transmitting the first data symbol using a first diversity branch;

said mapping unit for modulating said data using a second signal constellation pattern to obtain a second data symbol; and

said transmitting means for performing the second transmission by transmitting the second data symbol using a second diversity branch.

18. The transmitter according to claim 17, further comprising table means for pre-storing the first and second signal constellation patterns.

19. The transmitter according to claim 17, further comprising an interleaver and/or inverter to obtain different signal constellation patterns.

20. The transmitter according to one of claims 17 to 19, further comprising a forward error correction (FEC) encoder for encoding the data prior to modulation.

21. A receiver for an ARQ (re-) transmission method as part of a wireless communication system, comprising:

receiving means for receiving a first and second data symbol respectively modulated using a first and second signal constellation pattern and transmitted over a first and second diversity branch, and

a demapping unit for demodulating the first and second received data symbols using the first and second signal constellation pattern respectively, and

a combining unit for diversity combining the demodulated data.

22. The receiver according to claim 21, further comprising a memory means for storing received data prior to combining same.

23. The receiver according to claim 21 or 22, further comprising a forward error correction (FEC) decoder for decoding the combined first and second data after diversity combining.